

Date: Tuesday, 10/02/2009 11:09:13 AM  
User: Julie Dawson

# Process Sheet

Customer : CU-DAR001 Dart Helicopters Services Drawing Name : STUD  
Job Number : 45670  
Estimate Number : 13152  
P.O. Number :  
This Issue : 10/02/2009 S.O. No. :  
Prsht Rev. : NC Part Number : D36881  
First Issue : / / Type : MACHINED PARTS Drawing Number : D3688 REV B  
Previous Run : 44823 Project Number : N/A  
Drawing Revision : B  
Material :  
Due Date : 28/02/2009 Qty: 10 Um: Each  
Written By :  
Checked & Approved By : JLD 09.02.10  
Comment : Est Rev:A New Issue 08-01-29 JLM Verified By:EC  
Est Rev:B Material Change 09-01-07 JLM Verified By:EC  
Est Rev:C Added note on Step 2 09-01-26 JLM Verified By:EC

10 wdt

## Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

M174PHH900R1000

17-4PH SS ROUND BAR 1.00 COND.900



Comment: Qty.: 1.1414 f(s)/Unit Total : 11.4135 f(s)  
17-4PH SS ROUND BAR 1.00 \*\*\*CONDITION H900\*\*\*\*  
BATCH: 97110990

mk 09/03/05

10

2.0

BAND SAW

BAND SAW



Comment: BAND SAW  
\*\*\*DO NOT USE CHOP SAW\*\*\*  
Cut blank 11.673" long

mk 09/03/05

10

3.0

DOOSAN LATHE

DOOSAN LATHE



Comment: DOOSAN LATHE  
1-Turn as per Folio FA718 Rev: 11A & Dwg D3688 Rev: B

2-Deburr per dwg D3688

mk 09/03/06

10

4.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

mk 09/03/06

10

5.0

LATHE CONV.

CONVENTIONAL LATHE



Comment: CONVENTIONAL LATHE  
Face to finished length as per dwg D3688 AND center drill as per Dwg D3688

mk 09/03/06

10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Date: Tuesday, 10/02/2009 11:09:13 AM  
User: Julie Dawson

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: STUD

Job Number: 45670

Part Number: D36881

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

*ml* 09/03/06

20

7.0

DOOSAN LATHE

DOOSAN LATHE



Comment: Doosan Lathe

1- Turn as per Folio FA718 Rev N/A & Dwg D3688 Rev: B

2-Deburr per dwg D3688

*ml* 09/03/06

(10)

8.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

*ml* 09/03/06

(10)

9.0

QC8

SECOND CHECK



Comment: SECOND CHECK

*SA* 09/03/10

(10)

10.0

PG

PURCHASING



9.2111



Comment: PURCHASING

Issue P/O: 8382

LPI Per ASTM 1417 LEVEL 2

Certificate of conformaty is required

*C* 09/03/11

(10)

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

*49/3/11*

(10)

12.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

*09-08-12* (10)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Date: Tuesday, 10/02/2009 11:09:13 AM  
User: Julie Dawson

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: STUD

Job Number: 45670

Part Number: D36881

Job Number:



Seq. #:

Machine Or Operation:

Description :

13.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: \_\_\_\_\_

9/3/13

(10x)

50

14.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

209/03/16

(10)

Job Completion


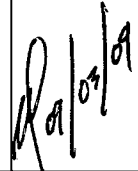


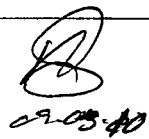


1209.03.16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
8/03/09	4.0	Vibration occurs during thread-cutting operation.  R.C. process		Center drill 2 sizes bigger from #2 to #4. See attached sheet.	8/03/09 			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	45670
<b>Description:</b> STUD		<b>Part Number:</b>	D 3688-1
<b>Inspection Dwg:</b> D3688 <b>Rev:</b> B		<b>Page 1 of 1</b>	

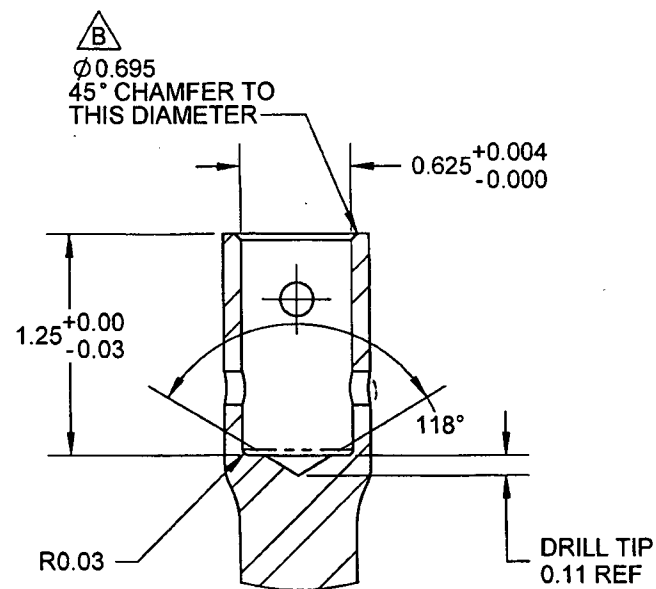
### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

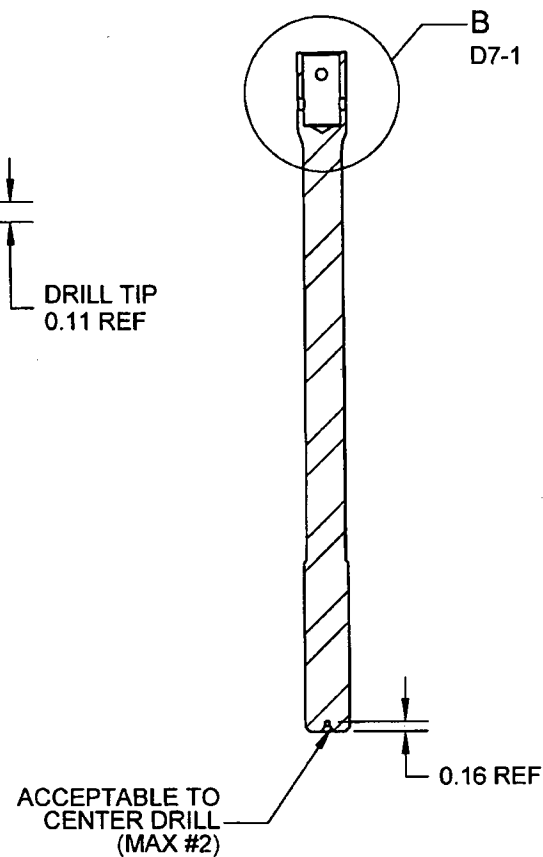
Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
1.25	$\pm .000$ $\pm .030$	1.232	—			
Ø.695	$\pm .010$	Ø.696	—			
.625	$\pm .004$ $\pm .000$	.626	—			
Ø.825	$\pm .010$	Ø.826	—			
Ø.189	$\pm .004$ $\pm .001$	Ø.193	—			
.870	$\pm .000$ $\pm .000$	.865	—			
Ø.659	$\pm .000$ $\pm .015$	Ø.650	—			
.131	$\pm .030$	1.310	—			
1.65	$\pm .030$	1.650	—			
11.573	$\pm .015$	11.578	—			
2.90	$\pm .030$	2.890	—			
.075X45°	$\pm .010$	.077X45°	—			
.370	$\pm .000$ $\pm .010$	.370	—			
Ø.189	$\pm .004$ $\pm .001$	Ø.193	—			
R.25	$\pm .030$	R.250	—			
R.50	$\pm .030$	R.500	—			
3/4-16UNF-2A	.7485 .7491	.7454	—			
M.O.W.	.7737 .7643	.7706	—			

<b>Measured by:</b>	<i>[Signature]</i>	<b>Audited by:</b>	<i>[Signature]</i>	<b>Prototype Approval:</b>	N/A
<b>Date:</b>	09/03/10	<b>Date:</b>	09/03/10	<b>Date:</b>	N/A

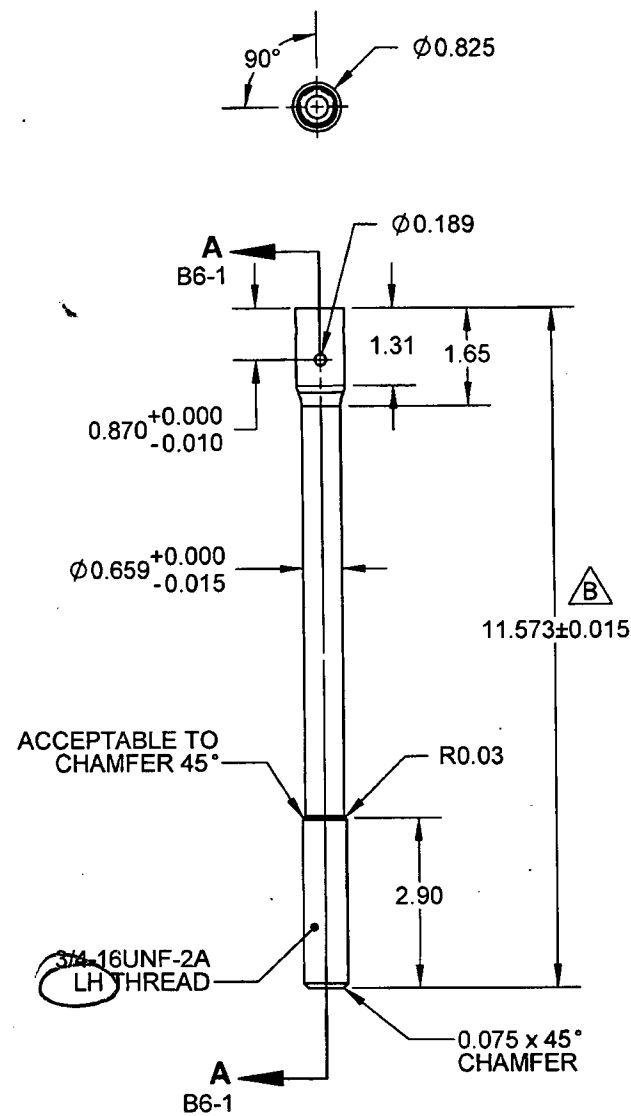
Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	



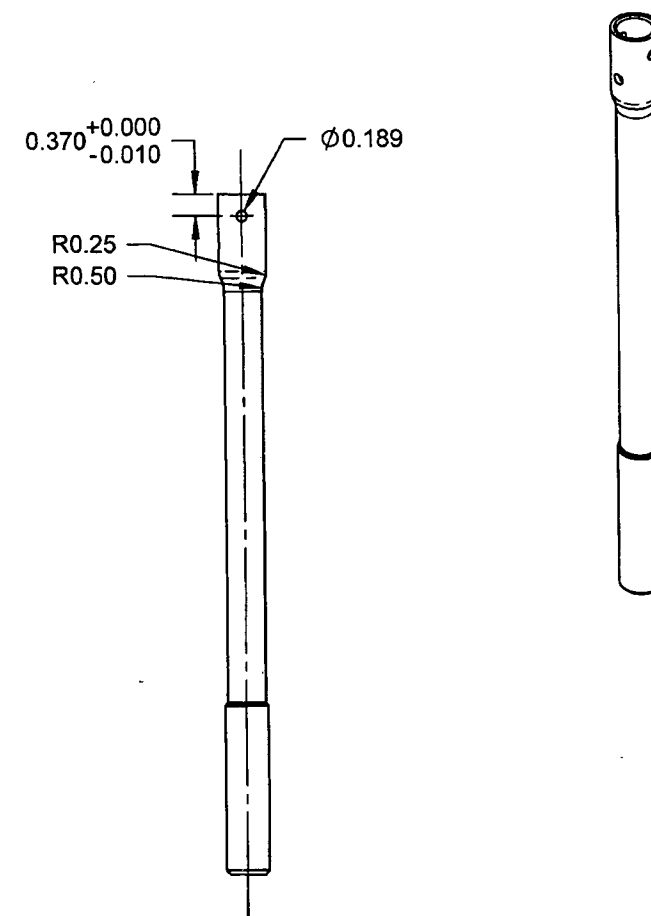
**DETAIL B**  
SCALE 3X  
D6-1



**SECTION A-A**  
D4-1



**D3688-1 STUD**



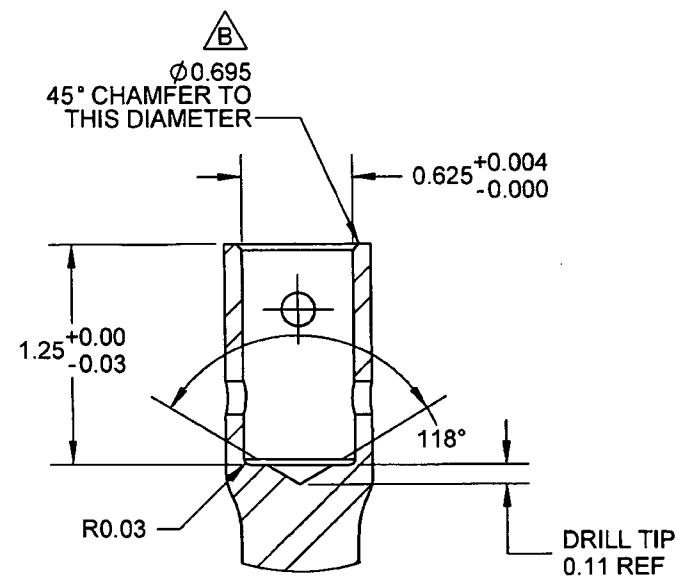
- NOTES:**
- 1) MATERIAL: 17-4PH STAINLESS STEEL ROUND BAR PER AMS 5643 H-900 CONDITION
  - 2) FINISH: NONE
  - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 1.24 lb
  - 8) LPI PER ASTM 1417 LEVEL 2

**RELEASED**  
08/12/15

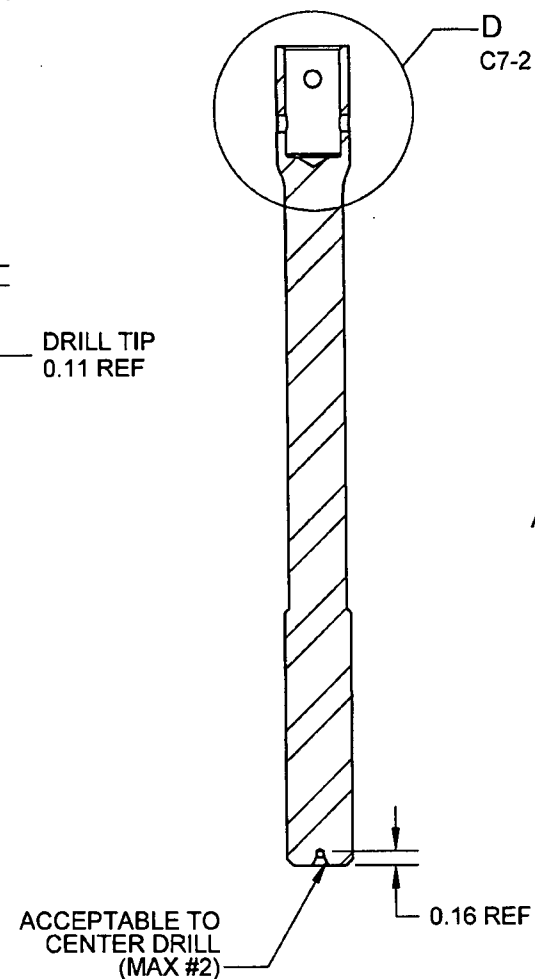
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WORK ORDER  
NO. 45670

B	CHANGE TO 17-4PH H-900 (ZN A8-1, A8-2, A8-3, A4-4); REDUCE LENGTH ON D3688-1 FROM 12.073 TO 11.573 (ZN C3-1) BASED ON PROTOTYPE INSTALL; Ø0.695 WAS Ø0.665 (ZN D8-1, D8-2, D8-3); Ø0.508 WAS Ø0.478 (ZN D8- 4); REFORMATTED TO CURRENT DWG STANDARDS	RF	08.11.24
A	NEW ISSUE	RF	08.05.22
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	92	DRAWING NO.	REV. B
MFG. APPR.	21	D3688	SHEET 1 OF 4
APPROVED	11	TITLE	SCALE
DE APPR.	11	STUD	NTS
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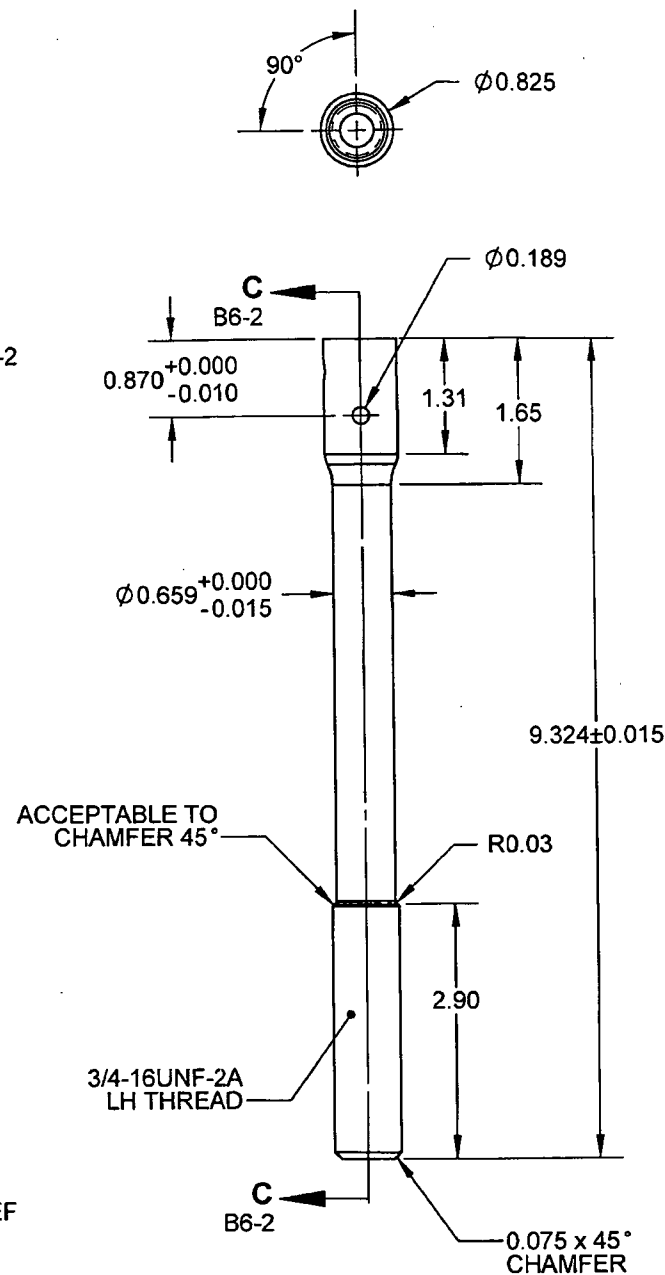




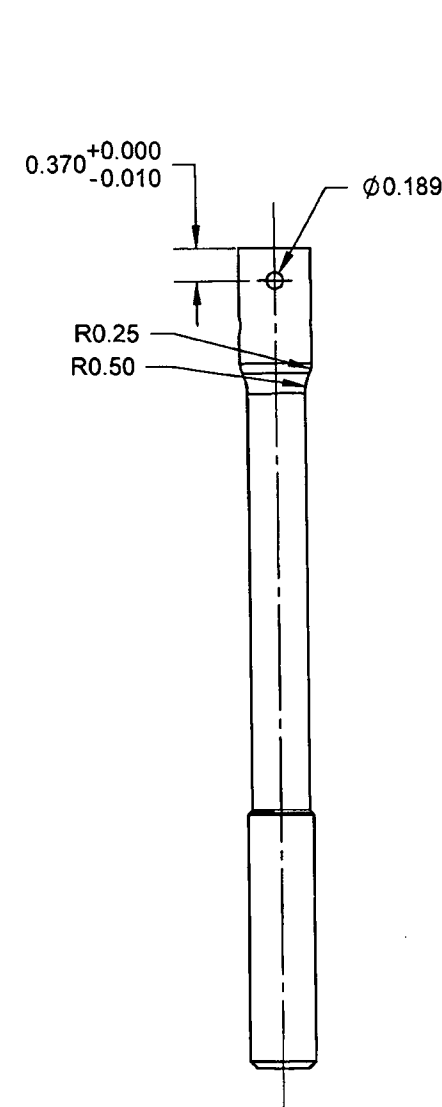
**DETAIL D**  
SCALE 2X  
D6-2







**SECTION C-C**  
D4-2



**D3688-3 STUD**

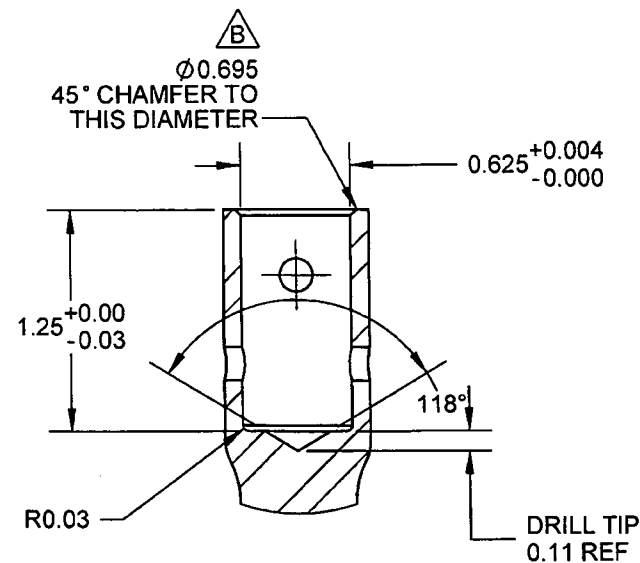


- NOTES:**
- 1) MATERIAL: 17-4PH STAINLESS STEEL ROUND BAR PER AMS 5643 H-900 CONDITION
  - 2) FINISH: NONE
  - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 0.97 lb
  - 8) LPI PER ASTM 1417 LEVEL 2

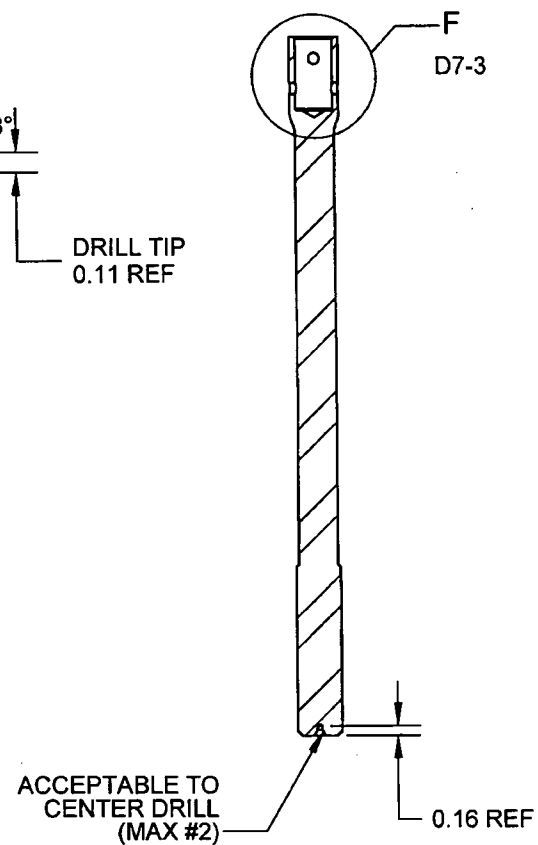
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CHECKED		DRAWING NO.	REV. B
MFG. APPR.		D3688	SHEET 2 OF 4
APPROVED		TITLE	SCALE
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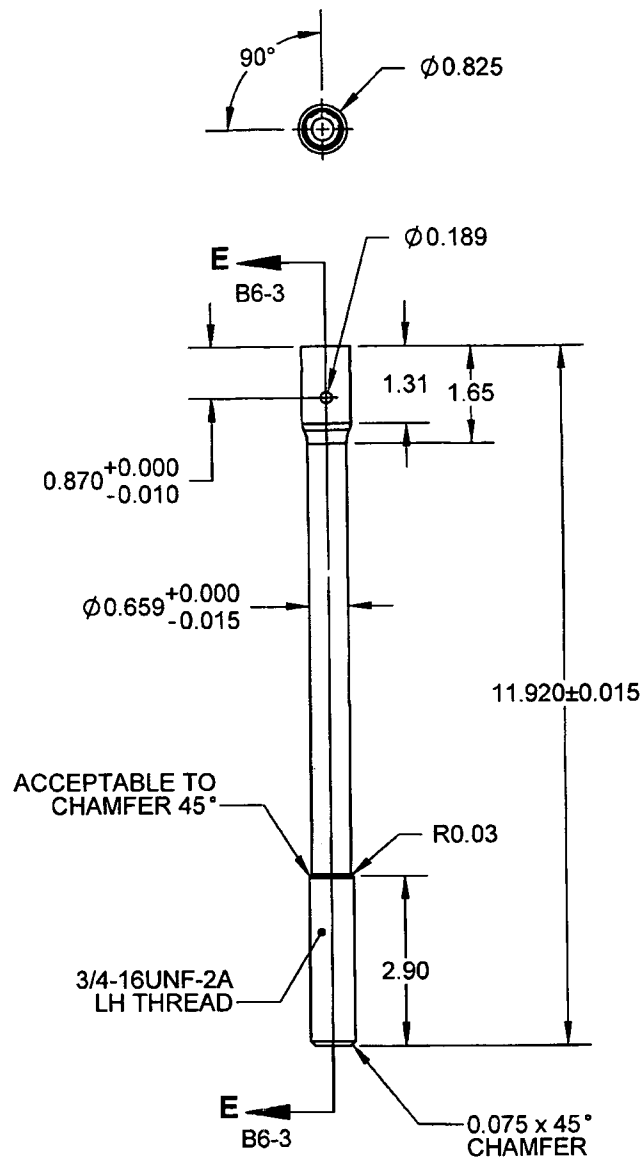
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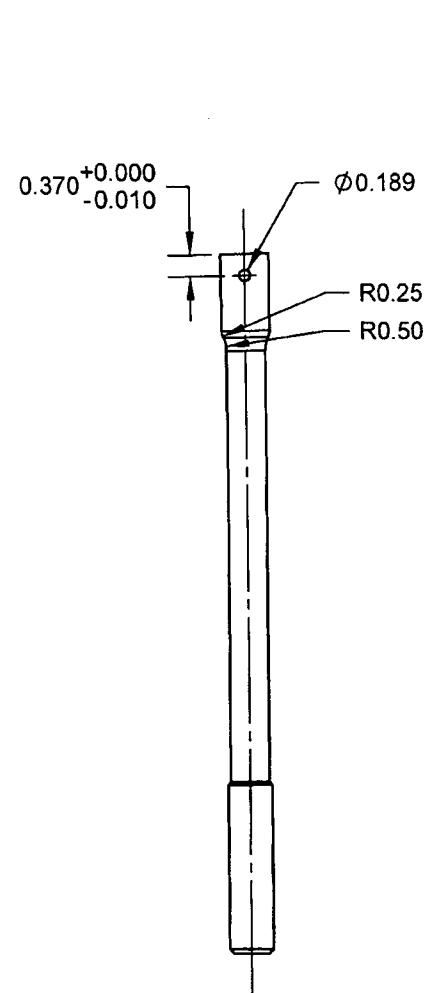
**DETAIL F**  
SCALE 3X  
D6-3



**SECTION E-E**  
D4-3



**D3688-5 STUD**

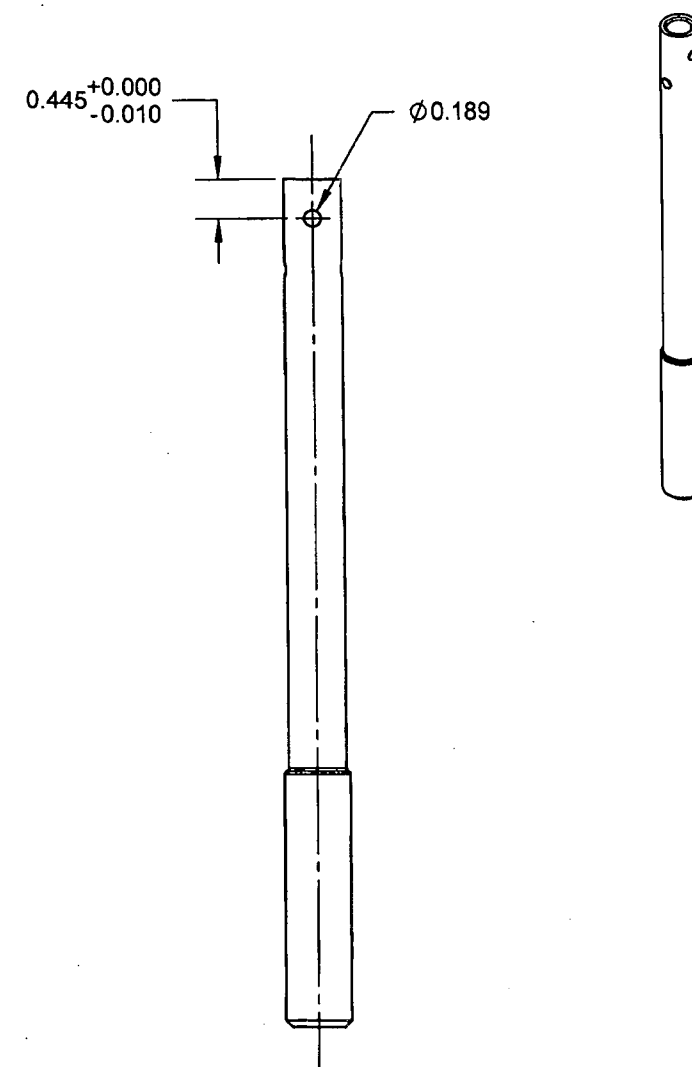
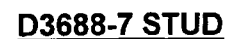


- NOTES:**
- 1) MATERIAL: 17-4PH STAINLESS STEEL ROUND BAR PER AMS 5643 H-900 CONDITION
  - 2) FINISH: NONE
  - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 1.26 lb
  - 8) LPI PER ASTM 1417 LEVEL 2

**RELEASED**  
08/12/15

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NO 435070

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CHECKED	<i>[Signature]</i>	DRAWING NO.	REV. B
MFG. APPR.	<i>[Signature]</i>	D3688	SHEET 3 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	STUD	NTS
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WORK ORDER  
NO 45670

**NOTES:**

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- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: 0.97 lb
- 8) LPI PER ASTM 1417 LEVEL 2

DESIGN	RF	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA  DRAWING NO. <b>D3688</b>  TITLE <b>STUD</b>  COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION OF DART AEROSPACE LTD.	REV. B
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MFG. APPR.	<i>g</i>		NTS
APPROVED	<i>[Signature]</i>		
DE APPR.	<i>[Signature]</i>		
DATE <b>08.11.24</b>			

## Jean-Luc Menard

---

**From:** David Shepherd [dshepherd@dartaero.com]  
**Sent:** March 9, 2009 12:48 PM  
**To:** 'Jean-Luc Menard'  
**Cc:** 'Mike Petsche'; 'Roberto Fuentes (Roberto Fuentes)'  
**Subject:** RE: engine mount studs D3691 & D3688

JL,

As discussed, it is acceptable to change from a #2 center drill to a #4 center drill on current production of the D3691 & D3688 engine mount studs.  
Please consider this email acceptance of this deviation.

Roberto,

Please work with Kim to put D3691 and D3688 Under Review.  
Then, please update drawings D3691 and D3688 for future production over the next month or so.

Thanks,  
David

-----Original Message-----

**From:** Jean-Luc Menard [mailto:jmenard@dartaero.com]  
**Sent:** Monday, March 09, 2009 9:44 AM  
**To:** David Shepherd (David Shepherd)  
**Cc:** Mike Petsche; Roberto Fuentes (Roberto Fuentes)  
**Subject:** engine mount studs D3691 & D3688

David,

As dicussed,we would change the center drill in the parts to #4 from #2.  
This would result in better support in the lathe resulting in better surface finish.

This is fine for these parts,what did you want to do for future parts?

Let me know.

JLM

Jean-Luc Menard

Production Engineering Coordinator

1270 Aberdeen Street

Hawkesbury Ontario

Canada K6A 1K7

Tel: (613) 632-5200 Ext 227

<mailto:jmenard@dartaero.com> jmenard@dartaero.com



## LIQUID PENETRANT TEST REPORT

P- 14935

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE MAR 11-2007 TIME AM ☒ PM ☐  
ATTENTION LINDA / CHANTAL ACUREN JOB NO. 188-09-007343  
ADDRESS 1270 ABELDEEN ST PO/WO NO. 8382  
HAWKESBURY, ON WORK LOCATION HAWKESBURY - SHIP  
KOA 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007  
PROJECT F.P.I. ON 100% EXTERNAL  
ITEM(S) EXAMINED FIVE CROSS TUBES -  
39 MACHINED PARTS - MOTOR MOUNTING

JOB DESCRIPTION PROCEDURE No. LT-XXX-XX REV./DATE TECHNIQUE No. LT-XXX-XX REV./DATE  
PART No. --- MATERIAL --- THICKNESS ---  
SCOPE WET FLUORESCENT LIQUID PENETRANT INSPECTION  
ON 39 STAINLESS STEEL PARTS, 5 ALUMINE ALUMINUM X-TUBES

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 1165 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT 2LC7 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO  
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE FEB 2008  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/ 50°F ☐ 10°C/ 50°F TO 52°C/ 125°F ☐ > 52°C/ 125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)  

9	JOB #	45671
10	#	45670
11	#	46051
11	#	46054
1	JOB #	46094
1	#	46092
1	#	46093
1	#	46371
1	#	46372

ALL ITEMS WERE FOUND ACCEPTABLE

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE Jan Titley DTR # E-19816  
TECHNICIAN (SIGNATURE): Mike J. Stow REPORT REVIEWED BY:  
NAME (PRINT): Mike J. Stow NAME INITIALS  
CGSB LEVEL 1<sup>st</sup> SNT LEVEL --- CGSB LEVEL --- SNT LEVEL ---  
CGSB REG. NO. --- CGSB REG. NO. ---